



**AIR CARGO TENDERS:
THEATER EXPRESS
FOR THE WORLD**

GRADUATE RESEARCH PAPER

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GRADUATE RESEARCH PAPER

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Degree of Master of Logistics

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10 JUNE 2001

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Abstract

Air Mobility Command (AMC) has historically focused on the movement of air cargo via whole aircraft loads. The process for moving these loads has been roughly similar for either organic (military or gray tail) aircraft or commercial augmentation. Cargo is aggregated at the aerial ports and consolidated onto aircraft as required. However, this has occasionally created “orphan cargo,” the single pallet destined for a location not serviced often by AMC.

The third party logistics business model has gained tremendous ground in the past several years. Companies all over the world have taken advantage of outsourced shipping, packing, door-to-door services, and the like, creating a multi-billion dollar freight forwarding/cargo handling industry which very often deals in less than full aircraft movements.

The assimilation of these two trends is the focus of this research. How to best leverage the strengths of the transportation industry to better serve our warfighters on the ground, within the fiscal constraints of the modern Air Force. This research looks in depth at the processes used currently in the South West Asia theater, and then briefly explores their applicability to the rest of the world.

For my little angels.

Acknowledgements

There are several people I would like to thank for their help with this project. First, I thank Doctor Bill Cunningham, Air Force Institute of Technology, for agreeing to be my advisor; his insight and guidance were extremely helpful. Thanks also go to Commander Scott Bennett, who put so much effort into setting up the Theater Express program, and especially to Col (ret) Glen Joerger, who arrived in Kuwait with a mission in mind and forced us to put Theater Express in place. Lt Chris Jones built the Best Value Algorithm and is a genuine genius. Finally, this has been a grueling year for my family and I appreciate all they had to do to support me.

Major Christopher N. Omdal, USAF

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I. Introduction

Background, Motivation & Problem Statement

Air Mobility Command (AMC) has historically focused on the movement of air cargo via whole aircraft loads. The process for moving these loads has been roughly similar for either organic (military or gray) aircraft or commercial augmentation. Cargo is aggregated at the aerial ports and consolidated onto aircraft as required. However, this has occasionally created “orphan cargo,” the single pallet destined for a location not serviced often by AMC.

In a war planning or major contingency scenario, the core mission set of AMC, this single pallet issue is easy to overlook. Most major scenarios have so much lift allocated to virtually every location that single pallets never have the chance to sit on the ground for long. Most scenarios face airlift shortages and Global Reach Laydown capacity challenges. This reinforces the AMC practice of focusing on whole aircraft movements—there does not seem to be another way to plan for really large movements in constrained time environments. In addition, most intra-theater movement plans have reasonably robust ground movement segments, allowing trucks to make up for any minor disjointed airlift movements. These factors all combine to mask the issues of single pallet movement and airlift economic efficiency.

The third party logistics business model has gained tremendous ground in the past several years. Companies all over the world have taken advantage of outsourced shipping, packing, door-to-door services, and the like, creating a multi-billion dollar freight forwarding/cargo handling industry which very often deals in less than full aircraft movements (**Regen, 2001**) These companies have been able to make profits in sometimes very difficult circumstances, as witnessed firsthand by the researcher in Kabul, Afghanistan. They are often very agile,

overcoming physical obstacles either through internal resources or contractual mechanisms, in a manner simply not duplicable by US government personnel.

In general, international or global freight forwarders work better with Customs than the US government. They often have long term relationships with Customs offices that rotational US forces cannot match, they usually speak the lingua franca, and with a local presence (again, either internal or contractual) they are able to stay abreast of changing Customs procedures, while US forces are not. The researcher was privileged to witness this procedure first hand in Kabul, Afghanistan in 2008, and the difference in reception between US government personnel and some of the movement contractors was markedly different. While US consignments languished in the holding yard for months, shipments scheduled through forwarders with local Kabul presence were hurried through and were delivered expeditiously.

Many of these forwarding companies own their own aircraft and move their own cargo internally. Two of the biggest, FedEx and United Parcel Service (UPS) are examples of this. They have vast service arms which reach out into an amazing number of the world's neighborhoods and business districts. They will pick up your packages and deliver them to almost anywhere a customer could require. They mostly use their own assets to move this cargo—trucks, vans, and aircraft all painted in the company colors. In fact, these two companies are significant contributors to AMC's Civil Reserve Air Fleet (CRAF) program. (A3B, October 2009)

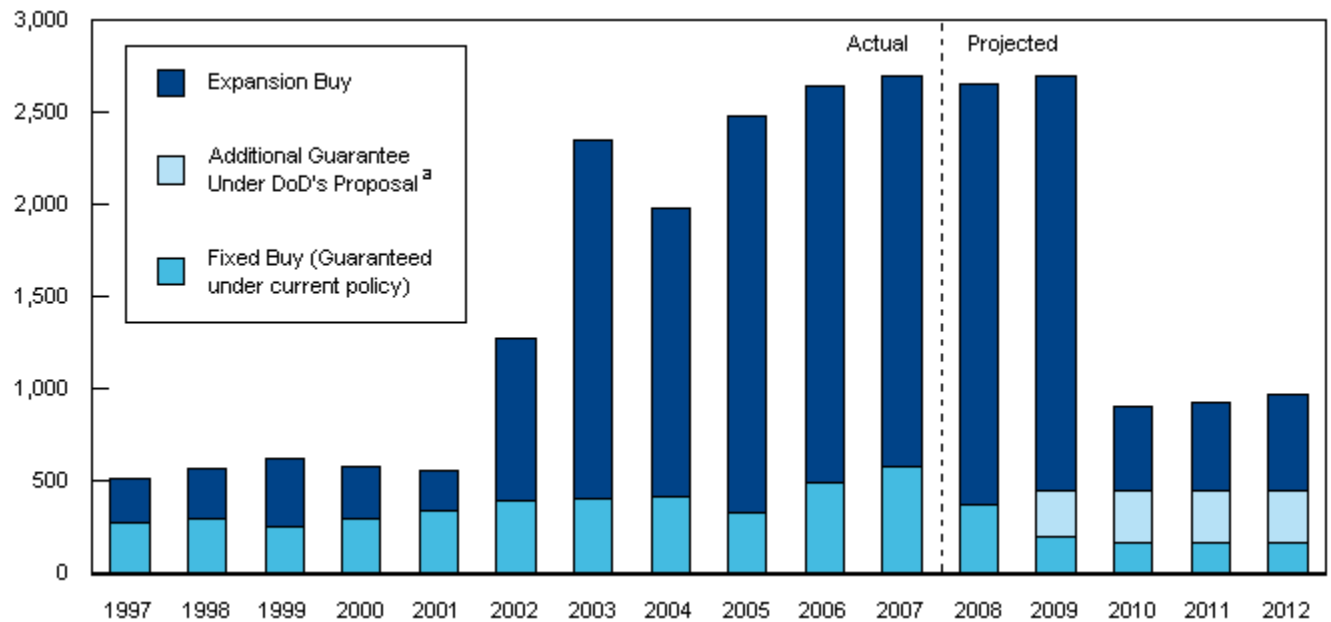
Other companies are designated as "non-asset based" companies. (Coyle, 2005) Although they might (or might not) have organic warehouses and material handling equipment, they mostly rely on contractual arrangements with common carriers to move cargo entrusted to them by customers. These companies effectively serve as brokers for general lift, rather than

owning their own fleets. They also usually consolidate less than truckload or less than container movements to secure better rates for shippers, if the time allowed for shipping is sufficient for this. Because these companies do not own their own assets, they are not CRAF members.

The CRAF is a critical strategic program for AMC and its parent command, United States Transportation Command (USTC) (Priddy, 1994), (Holt, 1996). It is a contractual program, whereby carriers sign an annual contract with AMC guaranteeing AMC access to their aircraft in the event of an emergency large enough to warrant a CRAF activation. The contract specifies the rates of payment for both peacetime and contingency work (Caswell, 2009). In return, AMC guarantees that it will support CRAF members with its commercial augmentation budget (Chow, 2003). This budget hires full aircraft to move either passengers or cargo based on two major tracks: the “fixed buy,” or missions planned and scheduled a year out, and the “expansion,” which hires missions on an as-needed basis. The fixed buy is primarily those routes USTC has tasked AMC to fly over the course of the given contract year. Passengers between Baltimore and Ramstein is one example of a routing which USTC is assured of a relatively constant demand. Expansion missions can vary tremendously. The CRAF activations of Desert Storm and Operation Iraqi Freedom are dramatic examples of expansion business, but there are a multitude of lesser-known contingencies which have required AMC to call on its commercial partners. (LMI, 2008)

Actual and Projected Expenditures for the Civil Reserve Air Fleet

(Millions of dollars)



Source: Congressional Budget Office based on historical and projected data on fixed and total buys from the United States Transportation Command. (CBO, 2007)

All told, this has been a very successful commercial-military relationship for well over 50 years. However, with few exceptions, it has kept in place the AMC-CRAF predilection for hiring whole aircraft charters over smaller movements.

The assimilation of third party logistics companies into the Defense Transportation System (DTS) without voiding the critical strategic CRAF program is the focus of this research. The overall goal is to develop an understanding of how to best leverage the strengths of the

entire spectrum of the transportation industry to better serve our warfighters on the ground, within the fiscal, physical, and political constraints faced by the modern US Air Force.

One place this type of partnership is being developed is in the US Central Command (CENTCOM) area of responsibility (AOR). The Combined Air Operations Center's (CAOC) Air Mobility Division (AMD), in concert with the CENTCOM Deployment Distribution Operations Center (CDDOC) began a program in 2006 to enlist commercial air cargo companies to move theater air cargo in single pallet increments. There were several drivers for this program, but the largest were a desire to move cargo faster, a decreased availability of C-130s (the theater workhorse airframe) and crews, a desire to move passengers more effectively, and an expectation that cargo could be moved commercially faster and at lower cost than it could be moved organically. This program has grown from essentially nothing in 2006 to moving approximately half of theater cargo in 2009 (Johnson, 2009). It has had a huge impact, and been entitled "Theater Express." This research looks in depth at the processes used currently in the South West Asia theater, and then explores the applicability of the program to the rest of the world, all the while attempting to maintain a focus on the viability of the CRAF program.

A note on effectiveness versus efficiency in military airlift: in the commercial world, it is possible to posit a trade-off between the two, allowing effectiveness to be a little less if significant efficiency can be gained. In military transportation, however, this is not acceptable. Effectiveness rules absolute, and efficiency can only be gained beyond the threshold of effectiveness. While definitions of effectiveness will vary from scenario to scenario, it is regardless what the military logistician must achieve. Lives are in jeopardy if effectiveness is not achieved. Efficiency becomes a "nice to have" once effectiveness has been achieved.

Research Focus

This research project focuses specifically on the Theater Express Program in the CENTCOM AOR and its applicability to other parts of the world. Data presented reflect the best unclassified data available to the researcher. Theater Express applicability as it relates to other theaters is based primarily on previous ASAM papers, but is conceptually viable in any environment. Finally, this research has focused on commercial air movement of cargo, which requires a reasonably secure airfield at both ends of the movement. The applicability of this research into genuine active combat zones is problematic, to say the least.

Research Objectives

The goal of this research project is to document a very intriguing business practice undertaken by the US Air Force (USAF) in its pursuit of enhancing combat effectiveness of its customers and its organic airlift fleet. This research also serves as a corollary to any fleet mix discussion for intra-theater airlift, a perennially thorny topic. If up to half of sustainment cargo can be moved commercially, as is now the case in CENTCOM, perhaps the fleet laydown can either be adjusted to be smaller, saving tax dollars, or can focus more on passenger movement, enhancing personnel combat effectiveness. Additionally, this research will be used to determine the feasibility of enhancing cargo delivery in other theaters to support operations at any level short of active war, at virtually any location on the globe, and the contractual requirements needed to be in place to effect these operations. The approach used throughout takes cues from Air Force Smart Operations for the 21st Century (AFSO 21) (AFSO 21, 2007), Business Process Reengineering (BPR), and deductive reasoning.

Investigative Questions

1. How is the AMD actually carrying out the Theater Express Program? This section will lay out daily and programmatic actions which the AMD has put in place. This encompasses the sub-issues of whether the program has been an unalloyed success, as well as identifying some of the concerns which have developed in the first 3 years of operation.

2. Based on the answers to the first question, is this program applicable to other theater environments?

3. Does Theater Express meet the intent of the CRAF contract, or is expanding it going to weaken the CRAF, and therefore AMC, over the long term?

Methodology

Analysis of this program is conducted with data collected by the AMD and aggregated by the CDDOC. The major aspects of analysis revolve around cargo amounts and their respective city pairs. This research will not try to optimize this flow; rather, it looks at a rough comparison of C-130 capacity versus the capacity offered by tender carriers on any given day, to approximate a level of deployment. For instance, if commercial carriers move 30 pallets on a particular day, they replicated 6 C-130 loads (using the CENTCOM planning factor of 5 pallets per full C-130) (CDDOC, 2006). This research will not bend itself to attempt to determine how many actual sorties were replaced by that same move, as that enters the complex realm of airlift scheduling which is well beyond the scope of this paper.

This research will also look at money spent on the program, with a focus on the cost per pound if cargo moved. In general, it is the researcher's expectation that the cost per pound will be lower for commercial partners than it is for organic USAF movement. The distribution between these two figures will be a key factor in forming conclusions and recommendations and

reviewing the overall program. Part of this figure is made up of what USTC has labeled “cost avoidance,” which represents the difference between the cost of organic and tender movement. This figure will be used to interpolate what the Theater Express program might cost (or save) if used in theaters other than CENTCOM. Analysis is primarily conducted with the aid of Microsoft Excel®; and although many of the figures provided for research come from the Access-based Best Value Algorithm, a model more comprehensive than Excel is not required for the levels of comparison supported by this research.

Implications

Although there are some significant assumptions and limitations that can only be resolved by a more robust, in-depth and classified analysis, including more advanced modeling tools and intelligence estimates between regions and city pairs, this research project aims to give decision makers insight into what an effective combination of organic and commercial airlift may look like and how these forces may be best allocated to their respective sectors of employment.

Sources

This paper utilized sources obtained through civilian and military transportation organization publications, reports, and websites. Primary sources of information include, but are not limited to:

- Joint and Service Specific Doctrine
- TRANSCOM
- AMC
- CENTCOM CAOC’s AMD and CDDOC

Organization

Chapter 2 reviews joint and service specific airlift doctrine, with a focus on the role of the CRAF included. Intra-theater airlift doctrine is also examined. Chapter 3 discusses the methodology used in this research. It also lays out the processes used by the AMD in allocating business under the Theater Express program, as well as some of the acquisition roles USTC has put in place for the program. Chapter 4 provides analysis of actual tendered airlift data, and dissects the results of the available data with respect to effective and efficient combinations of organic and commercial airlift capabilities. Finally, Chapter 5 summarizes the analysis and provides answers to the two research questions.

II. Literature Review

Introduction

This chapter begins with Joint Airlift doctrine, and then looks at the service doctrine which guides the implementation of the higher doctrine. This is followed with a review of the geographic theater guidance for air mobility, and finally looks at how the AMD integrates all of this guidance into practice in a system manned by rotational forces. This chapter will also look at some historical examples of commercial augmentation to military airlift for a comparison of how the Theater Express program follows historical precedents. This chapter will also discuss some of the business rules common to both military and civilian operations and the role various business process improvement methodologies play in the development of the program.

National Airlift Policy

The National Airlift Policy begins with “The national defense airlift objective is to ensure that military and civil airlift resources will be able to meet defense mobilization and deployment requirements...Military and commercial resources are equally important and interdependent in the fulfillment of this national objective.” (National Airlift Policy, 1987). This clearly marks out the joint military-civil strategic direction the DoD is tasked to pursue. Based on this root strategic guidance, military planners at all levels have laid out doctrine and programs to enhance the National Airlift Policy. Additionally, this policy sets a firm foundation for the CRAF program, and allows for innovative programs with industry such as Theater Express.

Joint Air Mobility Doctrine

Joint Publication 3-17 begins Chapter II with the words, “The Department of Defense, with cooperation from the civil sector,...” It then mentions “Given...the insatiable demands for

rapid global mobility...” These introductory sentences clearly set the stage for subordinate commanders to pursue the augmentation of the organic airlift forces with civilian assets. The Apportionment and Allocation discussion which makes up the bulk of the rest of the chapter is concerned primarily with resolving the competing demands of geographic commanders on the airlift system—again, providing ample rationale for implementing commercial solutions to cargo movement within a theater (Joint Pub 3-17).

Chapter III “provides the doctrinal foundation for command, control, and integration of air mobility forces.” (Joint Pub 3-17, pp. III-2). Not surprisingly, this focuses on the relationships which underlie the theater command structure for supported and supporting forces, both assigned and in transit. Commercial intratheater capability, since it does not fall under any military commander, is not directly mentioned. Indeed, the only command relationship between civil and military units is found in the discussion of airfield management, an obvious nexus between the two types of organizations.

Intertheater commercial movements, however, are discussed under the umbrella of airlift operations for contingency support. Essentially, doctrine calls on commercial aircraft to join with their military brethren supporting the sustainment flow which must begin as soon as any significant deployment begins (Joint Pub 3-17). While this doctrinal push for using commercial airlift is adequate, the broad guidelines established for command and control point towards the Tanker Airlift Control Center (TACC) as the execution authority for commercial missions (Joint Pub 3-17, 2002).

Speaking generally, this standard pushes commercial support towards whole aircraft charters, as that is the specialty of the TACC. Additionally, posting commercial missions against a contingency or deployment airlift requirement guarantees that the full aircraft charter policy

sustained by the TACC remains the primary interface between organic and commercial airlift. Even a small contingency movement will generate several full aircraft loads of personnel and equipment, making the hiring of full aircraft an efficient movement technique. This point enters prominently into the discussion of hiring third party logistics providers, as their modus operandi of moving smaller load increments could be strained by large contingency movements and they are not mentioned specifically in joint doctrine.

The factors planners should consider in mission planning are virtually the same for commercial or military missions—things like the location of the contingency, the types of passenger or cargo loads, the desired phasing of delivery, among others (Joint Pub 3-17, 2002). One of the other considerations mentioned specifically is overflight rights. Interestingly, this is one of the few areas where third party logistics companies have demonstrated an advantage over US military forces is in the CENTCOM theater. Many missions travel from Iraq, Kuwait, or Al Udeid to points in Afghanistan. All of these must take a highly circuitous route around the airspace of Iran, adding hours to every mission. However, third party logisticians carrying US cargo do not face this limitation, and are often able to fly directly across Iran, saving fuel, time, and therefore money in the process. This simply highlights the effects of one of the major planning factors pointed out in the tactical situation, as discussed in joint doctrine.

Chapter VII discusses some of the myriad factors which must be included in airlift planning, and on page VII-6 lays out the basic requirements for operating an aerial port. Among them are cargo handling equipment, capability for onward movement, airfield ramp space, warehouse facilities, and availability of petroleum products (fuel, oil, lubricants). This section also covers some of the mission support requirements which must be put in place for deployed air mobility operations, which can be quite extensive. It is not beyond the realm of perception to

see a potential conflict where a third party logistics provider could provide all of the above requirements—an airfield into which military cargo could mingle with commercial; warehousing for in-transit holding; commercial handling equipment and trucks with sufficient local knowledge to carry out onward movement to US forces, and the like. Add in a good relationship with local Customs officials, and the theoretical basis for third party logistical support seems to fit comfortably with US military airlift doctrine, with the added benefit of a smaller deployed military footprint.

On the other hand, the planning factors also discuss the vulnerability of airlift aircraft to external threats (Joint Pub 3-17, 2002) and some of the countermeasures organic aircraft can take. This is a huge factor in planning on commercial augmentation, as they are not expected to subject themselves to the same risks the military can ask of organic forces.

Joint Publication 3-17 also includes the doctrinal basis for AMC's contractual program, the CRAF. With the CRAF slated to carry up to 41 per cent of the military's bulk cargo and 93 per cent of planned passengers in a worst case scenario (Brewer, 2004) (Caswell, 2009), it is obviously a critical part of the National Air Mobility System. This drives home the point that any commercial augmentation scheme must be constructed in such a manner as to bolster CRAF program participants, rather than detract from their business base.

At the Joint level, much of the doctrine touching on commercial contributions to the overall effort is only tangential. Joint theater level doctrine, as found in Joint Publication 4-01.4, is more direct (Joint Pub 4-01.4, 2000). On page I-1 it points out that a theater distribution network will very likely be overlaid on some type of existing civilian infrastructure, and it implicitly urges military planners to create the best combination of US military, contractor, and commercial forces to operate the "nodes and modes of supply and transportation."

JP 4-01.4 delves in depth on the philosophy theater planners should embrace as they lay out theater distribution plans. Velocity and decreased cycle time is preferred over mass and large resource investments. The idea is that increased velocity will result in decreased customer wait time, and that a reduced customer wait time will enable field commanders to maintain only minimum essential stocks at forward locations. This will eliminate the waste of having large “safety stocks” on hand to support operations, which result from a lack of faith in the distribution system. This document also urges planners to establish confidence in a theater distribution system by establishing Time Definite Delivery, so customers will have faith their requirements will arrive when they are needed. Part of this is to establish clear communications and command and control, which allows customers to see where their shipments are while they are in transit. (DoDI 4140.61, 2000)

Joint Pub 4-01.4 (Joint Pub 4-01.4, 2000, pp. I-9) also gives a good sight picture of where the physical capacity of organic and commercial carriers fit into the overall scheme of the distribution system. Interestingly, this definition can be logically expanded to include both services and infrastructure either hired or purchased from local vendors, and in fact planners are urged to make the best use of both commercial and multinational partners.

The CRAF is approached from another direction in Joint Publication 4-01, Joint Doctrine for the Defense Transportation System (Joint Pub 4-01, 2003). It seems to take the civil-military partnership more for granted, and simply urges planners in the defense transportation agencies to cultivate a close relationship with the civil sector (II-12). As it goes on to develop more in depth relationships for mobility agencies, the CRAF is simply included as part of the expected transportation mix available to support worldwide taskings (III-1), as are “Non-US resources,” the category under which most of the Theater Express subcontractors fall. However, this section

also exhorts planners to adhere to the Fly America Act (FAR, 2010) and other DoD policies, which have traditionally and unequivocally supported a robust CRAF program.

Doctrine at these levels draws a clear distinction between intertheater and intratheater transportation (Joint Pub 3-17, 2002, pp. I-5) (Joint Pub 4-01, 2003, pp. IV-13) (Joint Pub 4-01.4, 2000, p. viii) and this has traditionally been borne out in practice. While there is some overlap of intertheater missions into an Area of Responsibility (AOR), the command and control structures used for the different types of missions are markedly different. Intertheater missions are planned controlled by the TACC, which has a global responsibility. The CENTCOM AMD plans and controls only those missions which are flown by aircraft under their control and within their geographic AOR. TACC missions which transit or deliver directly to ports in the AOR coordinate their movements with the AMD, but the doctrinal line between remains firmly in place between the two commanders.

CRAF is quite clearly an intertheater program. It is sponsored by AMC (whose execution arm is the TACC) (AFDD 2-6, 2006), and it is a critical part of most large intertheater deployment and sustainment planning. The tenders used by the AMD, on the other hand, began distinctly within the CENTCOM AOR. All of the city pairs specified in the tenders and the Best Value Algorithm are between airfields geographically linked to the AMD.

Regardless, as currently envisioned, the Theater Express program is a theater-level endeavor. According to a senior official, TACC has not considered using the tender process put in place in CENTCOM. Even when faced with “orphan pallets” (cargo in small increments destined for infrequently served airfields), TACC prefers the business rule of tasking whole aircraft, either organic or civilian, against their requirements.

Service Airlift Doctrine

Air Force Doctrine Document (AFDD) 2-6 is the governing document for US Air Force airlift doctrine, both inter- and intratheater. In the introductory “Foundational Doctrine Statements” it directly addresses the relationship between intertheater, TACC controlled forces and those controlled by theater commanders, and states that their integration is “critical” (AFDD 2-6, 2006, pp. ix,8). This agrees perfectly with the coordination relationship described above.

The next directly relevant foundational doctrine statement is “The success of worldwide air mobility operations depends on the combined efforts of regular forces, [ARC],...and civil air transportation partners” (AFDD 2-6, 2006, p. ix). Again, this amplifies the higher doctrine described above, essentially urging planners to focus on the best business practices which will maximize return on the combined efforts of all parties carrying out their part of the enterprise.

AFDD 2-6 also fleshes out the CRAF program significantly, and its relationship with both active duty and ARC forces. Interestingly, however, there is no mention of less than full aircraft charters at this level of doctrine. Based on this, and the higher doctrine which preceded it, it becomes reasonable to assume that, doctrinally, any program which ties in with civilian carriers must be structured in such a way as to strengthen the overall CRAF program.

Intra-Theater Airlift Doctrine

AFDD 2-6 also lays out many of the precepts under which US Air Force intratheater airlift forces are postured for employment. While it is still service specific doctrine, and therefore will not be followed in every theater, it does represent the US Air Force’s desired employment command structure. The COMAFFOR (Commander, Air Force Forces) should also be the JFACC (Joint Forces Air Component Commander), and the DIRMObFOR (Director of Mobility Forces, not a command position) should be the COMAFFOR’s senior advisor on airlift

matters (AFDD 2-6, 2006). As stated, this is the Air Force's desired command structure, and it will vary based on the desires of the geographic combatant commanders, who will create command structures best suited to their theater constraints. These are the leadership positions which will decide the top line factors defining a Theater Express-type operation. They will decide which performance factors will be weighted most heavily, and in so deciding will influence the award of potentially millions of dollars of business. The operational arm of this command structure is the Air Mobility Division.

AFDD 2-6 is also the document the Air Force uses to spell out the roles, responsibilities, and structure of the Air Mobility Division (AMD) in an Air and Space Operations Center (AOC) (AFDD 2-6, 2006). Many of the tasks specifically spelled out, such as "Integrate the execution of theater and USTC-assigned air mobility forces operating in the AOR..." (23) are clearly derived from higher doctrine, while others are delving more into the tactical arena with missives such as, "Assist the In Transit Visibility (ITV) and total asset visibility effort" (24). Regardless, this is the doctrine the US Air Force sees as necessary to support the desired command and control structure for any theater around the world. Interestingly, the tasks for theater command structures do not include direction for the inclusion of commercial carriers into the air mobility forces. It is implied that this is a higher level task to be retained by AMC at the national level. Unfortunately, this construct is not able to avail itself of the commercial capability operating within a theater of operations with the dexterity of a theater AMD.

Doctrine for combat employment and sustainment operations are discussed at length (AFDD 2-6, 2006). While this section is of course of critical importance for military flyers, the conditions which classify it as "combat" clearly rules out the use of civilian forces in these situations. Civil carriers are not expected to undertake the same risks military flyers are (73),

and commanders at all levels should plan accordingly. Relying on civil augmentation to military forces at an airfield which is regularly under fire is simply not a sustainable position. Although commercial augmentation has been carried out under fire in the past, relying on contractors to take on the same risks as military fliers is not realistic. (Moldrem, 2002)

Third Party Logistics (3PL)

Third Party Logistics, commonly referred to in the shorthand 3PL, is a broad and rapidly growing field. (Marasco, 2008) (Ashenbaum, Maltz, & Rabinovich, 2005) However, it is a field which really began to be defined only in the mid-1990s, and has developed from there. Marasco looked at academic coverage of 3PL in peer-reviewed journals in an attempt to quantify the various studies and reviews which have been published to date. She found 152 articles published between 1989 and 2006 on various 3PL topics, and she broke them down into 3 time periods. From 1989 to 1994, there were 11 3PL articles in her study. From 1995-2000, 55, and from 2001-2006, 86 articles were published. (Marasco, 2008) This publishing fact alone is a strong signal that the industry has been experiencing a period of significant growth.

Ashenbaum, et.al. attempted to interpret data from several surveys about 3PL usage by (primarily) US firms. They were able to compare annual surveys published by John Langley (Langley, 2004) and Robert Lieb (Lieb R., 2005) and statistically compare the results over time. While the methodology of the two surveys were different, the analysis of Ashenbaum showed an annual increase in 3PL usage and expenditures by US firms of approximately 5-8 percent from 1996 through 2004. However, this growth was not uniform, and was not always evenly distributed across sectors (Ashenbaum, Maltz, & Rabinovich, 2005).

One of the problems facing any researcher when applying the work of others to a new problem is that models which work well for a manufacturing industry, for example, might not as

clearly apply to a retail firm or a government enterprise. However, even if they are not a perfect fit, they can still provide decision makers with indicators they can use in shaping their processes and policies.

“[3PL] providers can be seen as supportive supply chain members.” (Bask, 2001, p. 472) Bask uses this phrase to introduce his discussion about why firms might turn to 3PL services. He cites possible benefits of using 3PL services as “[firms] can concentrate on core competencies and capabilities, concentrate on logistics management, improve overall performance, find global solutions,...” (Bask, 2001, p. 472). While he proposes these as general benefits, this passage highlights some of the issues faced in applying general business research to a military setting.

For the Air Force’s Air Mobility Command, the Navy’s Military Sealift Command, and the Army’s Surface Deployment Distribution Command in particular, 3PL is their core competency. Bask suggests that companies should engage 3PL services to essentially free them to focus on their core competencies and capabilities. (Bask, 2001) The organizations which make up the core of the Defense Transportation System own organic assets and contracting structures designed to best meet logistics demands from other service organizations for swift deployment or sustainment. They also maintain significant personnel and asset bases on airfields, seaports, etc. to enhance this service posture. Pursuing contractual mechanisms which allow manufacturing companies to focus on their core competencies, which are a commonly studied phenomenon (Marasco, 2008), is simply not applicable to these military organizations.

On the other hand, all of these organizations make use of contracted services to augment their organic forces. This has been a longstanding policy, as described above. The level of these services can vary. In AMC, as discussed, the primary form of commercial augmentation is whole aircraft charters. While this is a use of 3PL services, it is undertaken in wartime to meet

contingency requirements beyond the capabilities of the organic fleet, and in peacetime to ensure the commercial partners will be there during wartime. Either way, it is to augment a core capability, not replace it.

Bask also suggests that firms engage 3PL services to allow management to “...concentrate on logistics management, improve overall performance...” (Bask, 2001) These considerations seem to imply that firms would use 3PL augmentation to improve something like an order to ship time, or an overall customer wait time from order to receipt. This enters into a different dilemma faced by the military logistician not generally faced in industry. This performance metric extends across both the Defense Logistics Agency (DLA) and USTC. While both of these organizations are oriented to support troops in the field and, in general, work fairly well together, at some levels the organizations simply do not work well together. For instance, when queried in 2009 about the DLA-USTC relationship, a leadership member at DLA’s largest facility answered immediately with “We hate Transcom.” While USTC colored a rosier picture, when leadership begins with that attitude it presents some hurdles to overcome.

Metrics between the two organizations are a constant sore point, as both organizations point to the other as the cause of extended delays in customer order fulfillment. While rectifying this situation is beyond the scope of this paper, the point that these organizational dynamics are in place for the military logistician draws a distinction between studies done on commercial industries and the military.

Bask continues his study by looking at conditions which have led to successful partnerships in industry. He draws a distinction between routine service, standard service, and customized service. Most of AMC’s transactions for transportation fall into the routine category, requiring no special services. Standard service requires closer cooperation with providers and is

not as commonly used by the military. Customized 3PL services are mostly beyond the scope of this paper, but interestingly Contract Logistical Support contracts would seem to fit into this category. These are common contracts for aircraft support, in use with, among others, the KC-10, C-17, C-27A (supporting the Afghan National Army Air Corps), usually providing a mix of parts and services. In general, these contracts have been reviewed favorably by military users.

Bask additionally points out that the trend towards closer relationships drives “an increase [in] the number of strategic alliances and long term partnerships, thus allocating a larger share of business to a significantly smaller number of carriers.” (Bask, 2001, p. 475) This is a logical conclusion; as firms form alliances and strategic partnerships, in order to nurture and structure those relationships they will have to share significant internal information and share what were formerly internal operations for both firms. This type of relationship demands exclusivity; if a firm forms a strategic partnership with a carrier and then gives business to another carrier outside the partnership, it is a reasonable conclusion that the partnership is not a strong one. Alternatively, if a firm forms a strategic 3PL partnership and the 3PL firm is found to have offered its services to a competitor at comparable rates, this too could be a sign of a weak relationship.

In the military, forming long term strategic partnerships with commercial industry is exceedingly difficult. Even the CRAF, which has been a long term arrangement and highly successful, is set up on an annual contract. This time frame forces the AMC-civilian carrier relationship to be kept at arm’s length, preventing the development of long term partnerships. Tenders have an even shorter time horizon, as they are not even contractual and cover only the period the carrier is actually transporting cargo tendered to them.

An extension of the 3PL literature is the topic of Performance Based Logistics (PBL). This is a significant push in the DoD. The Defense Acquisition University (DAU, 2010) defines PBL as “a support strategy that places primary emphasis on optimizing weapon system support to meet the needs of the warfighter.” This rather vague definition is expanded to mean that warfighters define clearly the metrics they need contractors to meet, and then pay for performance. For instance, meeting bare minimum delivery times might earn bare minimum payments, but making faster or more accurate deliveries might earn a premium. “In short, PBL is buying Performance, not transactional goods and services.” (DAU, 2010) The PBL focus is on buying system availability or “up time,” rather than earlier contracting methods which emphasized either number of spares, hours spent working, number of repairs, or other contributors to the mission.

PBL is the contracting actualization of the fact that the warfighter customer really only cares that a system is operational when called upon. It is a mandatory policy, as laid out by the Undersecretary of Defense for Acquisition, Technology, and Logistics in a memorandum focused on lowering total life cycle costs and performance. (Aldridge, 2003) This is accompanied by a 10 page PBL template for requirements authors to consider when building contracts for logistics support.

Conclusion

The preceding literature review provides the basis for this research. The president has provided sound, broad strategic direction with the National Airlift Policy, a document which has stood for over 20 years. The joint community has developed airlift doctrine to direct service efforts, and the Air Force has developed supporting doctrine to put the National Airlift Policy into practice. Yet more detailed guidance has been developed by theater commanders regarding

intra-theater airlift doctrine, which is almost by definition joint in execution. All of these frame the discussion regarding the legitimacy of the Theater Express program within a DoD construct. In the net, the Theater Express program is supported by these doctrine documents. It is a logical extension of the National Airlift Policy, and, properly executed, can support the strategic goals laid out in the National Airlift Policy.

The literature on third party logistics is abundant and growing. The purpose of its review was simply to lay out the larger business context in which Theater Express contractors operate.

III. Methodology

Research Design

The main goal of this research was to document the processes taking place within the AMD and project their utility in other theaters of responsibility. The daily operations of the AMD make up part of this, but the back shop support provided by AMC and USTC is also critical. Some of the programmatic steps taken by these entities have provided critical underpinnings to this program, and these will have to be replicated in order to transfer this program beyond the CENTCOM AOR. This programmatic support will also have to include its support of the CRAF program.

To explore this topic, three investigative questions were examined. A discussion of these investigative questions and the methodology utilized to answer them follows.

Investigative Question 1:

1. How is the AMD actually carrying out the Theater Express Program? This section will lay out daily and programmatic actions which the AMD has put in place. This encompasses the sub-issues of whether the program has been an unalloyed success, as well as identifying some of the concerns which have developed in the first 3 years of operation.

The basics of the AMD process are repeated daily. It begins with a check of on-hand cargo at aerial ports throughout the theater. Interestingly, the Defense Depot at Kuwait SWA (DDKS), for the purposes of this program is classified as an aerial port, so the cargo it produces is included in this daily roll-up. This on-hand data is parsed to ensure only eligible cargo is offered to tender carriers—most weapons and other sensitive cargo are not eligible for commercial carriage. The list of cargo deemed eligible is then sent out to the aerial ports for “on the ground” validation.

This validation is critical. It addresses any changes in cargo status which has happened since the on-hand report was pulled, e.g. cargo which has either arrived or departed or been entered into some frustrated status. Moreover, it informs the aerial ports which pallets in their yard are being offered to commercial tenders. After the AMD has offered cargo to a carrier, it is not allowed for the aerial ports to ship it, even if the opportunity arises. This has been a significant critique of the program, that aerial ports lose flexibility in how they handle cargo. However, the net effect of this critique has been both minor and easily overcome. Personnel deployed into theater have been able to quickly adjust.

Once the aerial port validates the cargo list being offered for commercial tender, the AMD is then free to forward that list to the seven participating carriers in the program. The list is sent at roughly the same time daily, so the carriers know when to check, and from the time of the AMD offering carriers have one hour to respond with their offers.

The next step is for the AMD to choose the best method for moving the cargo. Organic airlift costs are compared against a composite commercial rate. The makeup of this rate is critical, and integral to the success of this program.

Rates

Theater Express is based on tenders, rather than contracted rates. A tender is a non-contractual arrangement by which a shipper (in this case the AMD) offers cargo to carriers, who bid to carry it or not. (Coyle, 2005) Neither side is obligated to either offer cargo nor carry cargo under a tender, unlike a contract which could specify amounts of payment, capacity offered, or other considerations. Therefore, tender carriers have a high degree of flexibility in accomplishing their missions, once they accept them, and the AMD is not required to provide any consistent amount of cargo to maintain a contractual relationship. Freight tenders are most

common in commercial trucking, but they are also used in air freight regularly.

(Freighttender.com, 2010)

The base rate for tender carriage between any two city pairs is arranged as part of the tender offered by the carrier. It cannot be raised by the carrier easily outside of the annual renewal period. It can, however, be lowered by a carrier on any given piece of cargo between any city pair. This is a key part of the “bidsmanship” which takes place daily among the carriers. Each player knows the base rate filed by the other carriers, and attempts to price their daily offerings to best fit their business model.

Additionally, bids are adjusted by the AMD to reflect quality of service and timeliness. The AMD has the unilateral ability to assess demerits against carriers if field units report shoddy cargo handling practices or if a carrier delivers cargo late. Cargo delivery time is what is reported in the Global Transportation Network (GTN), via either GATES, a RFID read at the destination, or EDI input from the carrier. This delivery time is therefore critical, and carriers have been quick to update their EDI practices to accommodate this part of the program. The net effect of the demerits assessed is a slight addition during the award process to what the carrier offers on a particular item. For example, if a carrier with demerits bids on a movement at \$1.10 per pound, the AMD’s system would use demerit factors to effectively increase the carrier’s bid to an adjusted rate of \$1.15. This would allow a carrier without demerits to win the bid even if they bid a slightly higher \$1.12 per pound. If the carrier with demerits actually wins the bid, they are still paid only the \$1.10 of their tender, not the adjusted rate considered for the award of business. This adjustment drives the system to automatically punish sloppy or tardy performance, while using the same process in reverse rewards timeliness—by carrier, by location. Other factors which can adjust offered rates include whether the carrier uses its own

ground handling services at either the origin or destination or both, or if the carrier chooses to “link” bids.

Linked bids are contingent upon other awards. For instance, a rate of \$1.00 per pound might be offered between locations A and B, as well as locations A and C. A linked offer might state that if offered cargo for both B and C, the carrier would carry it for \$0.80. Therefore, in some cases, this is the final price which must be compared against organic military costs of moving the pallet.

Best Value Algorithm

To manage all of these adjustments, AMC’s A9 Directorate has developed, in conjunction with CENTCOM’s AMD, a “Best Value Algorithm.” This computer program considers all of the rate factors described above and delivers a recommendation for the AMD Theater Express agents. The recommendation rank orders the tender carriers from 1 through 7, which suggests, by pallet, which carrier should be offered which cargo between any given city pair. If the agent does not wish to take that recommendation for some reason, that remains an option, but usually the recommendation is suitable.

The real value added of the program lies in its business process reengineering aspect (Hammer & Champy, 2003). The utility of this tool is huge. What it has done, in the steps described above, is to automatically and almost instantly rank order business offers based on a very complex set of business rules. However, more than this, after cargo is awarded to a carrier, the program retains the information. This allows for an audit trail to remain after a transaction is complete. An audit agency can look not only at what business transactions took place, but they can also see why those companies were picked, and view comments from agents who did not take the program recommendations—long after the fact.

Additionally, the program contains the best cargo status query tool the researcher has seen to date in the Air Force. It can perform multiple GTN queries simultaneously, and then compile the results into a single spreadsheet. This is an incredibly powerful tool. Since payment is only made after cargo is delivered, the contracting and finance person or paying agent working with the program needs to know when delivery has occurred. As described above, delivery is defined as the time GTN reports the relevant Transportation Control Number (TCN) arrived at a destination through GATES, an RFID tag read, or the carrier's EDI inputs. At this point, contracting is free to pay the contractor. This program allows a paying agent to search deliveries by day (i.e. status of all deliveries for a given day) with a single GTN input. Ordinarily this would be a tremendously lengthy process, as GTN would have required the paying agent to enter every TCN being traced.

Moreover, this program makes it easy for the AMD's Theater Express agents to check carrier timeliness by day, route, etc., using the same function. And as simple as the algorithm makes the lookup process, this can still take some time—so timeliness metrics for rate adjustment are maintained automatically by the program. The agents are not required to manually check and update this data, and the relevant rate adjustments will be made regardless.

Essentially, this program can assist an agent in deciding which cargo should be offered to which carrier, can automatically notify the carrier and the concerned aerial port, can check GTN for a delivery time so the carrier can be paid, and will keep an audit trail of this process ad infinitum. Moreover, it was developed in house by AMC/A9 and runs on an Access database, so it can be instantly installed anywhere in the Air Force system without special licensing. The researcher has not seen any other Air Force project this well executed in his 14 years in the Air Force.

Cost Considerations

In many circumstances, commercial carriers are able to move cargo for less than it costs the government to fly it organically. In order for the CDDOC to know if this would be the case in the CENTCOM theater could, the AMD had to put it in place and try out the system. One of the first areas where the CDDOC wanted to augment the AMD with commercial capability was some of the longer missions with relatively low demand. One of the better examples was missions to the Horn of Africa (HOA).

HOA missions were driven by cargo demand. However, cargo demand for HOA was irregular, and was almost entirely cargo inbound to HOA. Demand outbound from HOA was minimal. Therefore, cargo could wait at one of the airlift hubs for days without building up sufficient volume to generate a dedicated mission. Finally, after a piece had sat long enough in the aerial port system (and this length of time varied by conditions in the theater, there was no fixed scale), it would climb high enough up the priority list to generate a mission. Unfortunately, often these missions would consist of one or two pallets on the outbound leg, and no pallets at all on the return. This meant that the AMD would generate a C-130 mission to carry 2 pallets for 5 flying hours out and 5 flying hours back, long enough that there was insufficient crew duty day remaining (AMC) for the aircraft to pick up another mission segment. Moreover, even though the mission was being flown by USAF organic crews and dedicated theater airlift, there is a direct cost associated with organic flying hours. In consultation with US Transportation Command (USTC), the CDDOC used these direct flying hour cost figures to compare the cost of tenders to the cost of flying organic aircraft on missions such as these.

The comparison was remarkable. The operational cost for flying a C-130 was put by USTC at approximately \$5,957 per flying hour. (CGAP, 2006) This meant that the HOA

mission described above flew 2 legs at 5 hours apiece, for a total of 10 hours. At \$5,957 per hour, this meant the government was paying, in direct costs, \$59,570 to deliver 2 pallets. A tender carrier offered to carry cargo between Al Udeid and HOA for \$1.70 per pound. This meant that unless the total weight of the pallets was over 35,000 lbs (which is not possible), it was cheaper to hire a commercial carrier to move it than it was to fly the cargo organically. This was in direct flying hour costs to the government; the opportunity costs for the aircraft and crew availability were not considered in this figure. Additionally, the commercial carrier would agree to move the cargo with a specified number of days or hours, so HOA would receive faster service.

Using the data that were available at the time, the average pallet size in theater was in the neighborhood of 3,500 pounds. This meant that only very extraordinary circumstances would generate a two pallet load in excess of even 10,000 lbs. The cost avoidance to the government was substantial and immediate. Comparing just this example and assuming heavy pallets of 4,000 lbs each, the government direct transportation cost was \$59,570, while the commercial cost at \$1.70 per lb came to \$13,600. This represents a savings of over 75% on pallets which are well over the theater expected average--using the average of 3,500 lbs brings the total tender cost down to \$11,900, 80% less than the direct government cost. Of note is the fact that when weight drops, the per pound pricing of tender movement drops as well, while organic costs are the same for one pallet or five.

Carrier Safety

Safe carrier operations were a major concern as this program began. The foreign flag subcontractors hired by the CRAF partners to move cargo under the program's auspices sometimes demonstrated more flexibility in their operations than a typical FAA certificated

carrier. For instance, one carrier landed at Al Udeid without prior permission, and when informed the aircraft would have to remain overnight, the pilots shrugged and laid out their bedrolls under the wings of the aircraft. (Purtee, 2006) Other criticisms were laid against carrier handling of cargo, safety of using Russian Antonov 12s and Ilyushin 76s (An-12, Il-76), and operational safety of the aircrews.

Aerial port personnel in the Air Force treat air cargo with extreme caution. They are very cognizant of the responsibility they hold to ensure millions of dollars of high value cargo makes it safely through the Defense Transportation System, and they take great pride in their professional skills. Working with some of the civilian tender carriers, it was immediately evident that this professional system had not expanded worldwide yet. Aerial port personnel were required to exercise significant flexibility and creativity to work with some of these carriers, and this has been an ongoing challenge. However, the reports from 2009 are a far improvement from the program's inception in 2006. While some compatibility problems remain, by and large, our aerial port personnel have forced the commercial carriers in the region to improve their service levels, at least for USAF cargo. The photographs of junk piled high atop USAF pallets as the crew (all smoking) awaited a forklift have slowed to a trickle. Most of the carriers are operating regularly with the Theater Express program, and have developed more professional ways because of it. This is a direct result of US mentoring, and feeds the Joint goal of local economic development in the Iraq and Afghanistan theaters (Gomer, 2006); (Miranda, 2009); (MNFI, 2009).

Another safety concern has been that the Russian aircraft favored by carriers in the region are generally not equipped with rollers in the floor, as are USAF aircraft. These rollers dramatically improve safety and ease of cargo handling. Once a pallet has been placed onto a

US aircraft by a forklift or specialized loader, it can be maneuvered into position by just 2-3 personnel. The Russian aircraft have flat wooden or riveted aluminum decks, and rely on an overhead crane to maneuver cargo about the aircraft cabin. As long as the crane is operational, this system works. However, if the crane is not working, options are limited as to how a crew can shift cargo to the rear of the aircraft for unloading. Generally it involves a pallet jack and a lot of hard labor, which in the confined spaces available are a safety hazard in themselves. Couple this with the carriers not following USAF safety policies (using gloves, removing rings, steel-toe boots, earplugs, etc) and the possibility for safety incidents increases dramatically. The more lax safety attitude is evident in the picture below, where the loadmaster is standing near an open rear door in flight holding onto a strap. In any western aircraft, that loadmaster would have a safety harness on to prevent falling out the open door. Additionally, the cargo on the floor of the aircraft would be strapped down in a much more stringent manner than the picture shows. While the configuration shown is not necessarily dangerous, it is not as redundantly safe as a US aircrew would specify to account for inclement weather or any other circumstance out of the ordinary.



Interior of An-12 with rear petal door open in flight for demo. Note overhead crane, wood floor, and lack of rollers. Copyrighted image used with permission.

An additional safety concern is that the registration countries for many of the Theater Express subcontracted aircraft impose less stringent requirements upon aircraft operators than does the FAA in the United States. This has caused significant friction with host nation airfield authorities, and AMC and USTC are engaged to both mitigate consequences with host nations and attempt to require CRAF carriers in the program to enforce safety standards with their subcontractors. While this complicates the contractual relationship between carriers, it should go a long way towards both alleviating host nation concerns and improving the US mentoring process in the drive to create a more professional, stable economy for the region. (Gomer, 2006) (Miranda, 2009) (MNFI, 2009). Additionally, this step will be a crucial one in determining the applicability of this program to other theaters of operation around the world.

Command and control relationships between civil carriers, civil authorities, and the military can become strained when an airfield must host shared operations (Joint Pub 3-17, 2002, pp. III-13). Even between the various branches of the US military, airfield conflicts can arise; when this is complicated by commercial operations it can become a very serious safety issue, as observed repeatedly by the researcher over the course of 2008 in Kabul, Afghanistan. Joint airlift doctrine urges the theater commander to first establish a single senior airfield authority, who can then move to integrate commercial and military airfield command and control so as to guarantee safety of flight for all parties. This step is a critical one for the introduction of a Theater Express-type program. In most scenarios, this type of cargo capability will be augmenting military organic airlift, virtually requiring shared operations at airfields at some point in a wider conflict. Therefore, particularly in the absence of strong central governmental authority, integrating military and civil operational safety measures is a prerequisite to smooth, accident free airfield operations.

Opportunity Cost

One of the underlying assumptions when the program was created was that the AMD was being forced to spread their airlift assets too thinly across competing demands. One of the drivers for the CDDOC enlisting commercial assistance was to simply augment the AMD with commercial cargo capability, especially for some of the longer missions with relatively low demand. This concept required continued or improved service levels, cargo capability without too many restrictions, and a concept of operations which allowed the benefits of the Theater Express program to extend to the entire airlift system

Service levels in air cargo are critical. (Coyle, 2005) Shippers are usually paying a premium for the speed air transport offers, and so generally offer up only their most important

cargo. Lower priority cargo can take longer to reach its final destination, so cheaper surface transport is an acceptable alternative to air for most items. However, in the military arena, service levels can literally mean life and death for thousands of personnel. Cargo with a fixed delivery date absolutely must make it on time. Therefore, one of the first cornerstones of the program was to require service level commitments from carriers offering tenders. They had to match or exceed expected organic transportation times to final destination. This was the only way the AMD could put this program in place and not face a customer revolt among its shippers. Long delays would have ended it quickly.

Since implementation, delivery reliability has been very good, at least comparable to organic airlift. While it varies by different locations, some places (such as the HOA example described above) benefitted tremendously. The AMD has been very aggressive about monitoring contractor performance, and the Best Value Algorithm described above does a fantastic job of simplifying this process.

Commercial capability which has too many restrictions is almost worse than no capability at all. If airlift capacity is out there, but it cannot be used except in very constrained circumstances, it then cannot be planned on with any reliability or regularity. Therefore it was imperative that carriers offering their services had to be able to carry virtually any general cargo. There is some cargo which is not available for the AMD to offer (notably Classified or certain types of hazardous materiel), but commercial carriers in the program should be able to carry virtually any of the rest. This means their aircraft need to be able to accommodate 463L pallets (Global Security, 2009) and associated material, and in some cases rolling stock.

Finally, a system which could maximize the benefits of the tender program requires some flexibility (AFDD-1, 2003). The key to this factor was being able to use commercial carriers on

routes which were not restricted to military operations--in other words, those considered safe enough by the AMD for commercial traffic. Additionally, the program should first choose routes which took up a significant amount of organic capability with little payback (as in the HOA example above). Finally, the capability freed up by using the tenders should be routed to move cargo over the more dangerous ground routes in the theater (Furber, 2007).

Investigative Question 2:

2. Based on the answers to the first question, is this program applicable to other theater environments?

To answer this question, the different geographic commands must be examined by theater. CENTCOM has already been discussed in depth throughout this paper. The European theater, managed by EUCOM, the Pacific theater, managed by PACOM, and the African theater, managed by AFRICOM are all very different and have varying demands. (DefenseLink, 2010) Some portions of all theaters are more developed than others, so overall generalizations will almost certainly be inaccurate. However, generalizations which cover large swaths of a theater reasonably accurately can be useful in operational planning.

First, they differ in raw size. EUCOM covers all of Europe, but PACOM covers the two thirds of the world made up by the Pacific Ocean and most of the Indian Ocean, too. Additionally, their geography affords them differing levels of transportation options. For instance, PACOM has the option of using water transportation for most of its theater, while AFRICOM does not.

Second, the theaters differ dramatically in their transportation infrastructure. At its most basic, this means roads. However, all modes of transportation must be taken into consideration. Therefore, a more complete assessment should include seaport facilities, inland waterways, and

airport facilities, both for aircraft and land-side connections to airports. The theaters differ dramatically in their levels of transportation infrastructure.

A necessary corollary underlying transportation infrastructure is the services available in the local economy. Services, such as freight forwarding, trucking, specialized haulage, and support activities are all necessary to commercially support military operations. In their absence, organic support is the only remaining option, which obviates the option for a Theater Express support program. Generally, an economy with more services will be able to support a larger military operation than an economy with fewer commercial options. However, as has been shown in the CENTCOM theater, even if commercial services do not exist, decisions by military forces as to how contracts will be awarded can provide sufficient incentives for firms to shift resources to new areas. Regardless, to support intermittent or low intensity operations commercially, an economy must have sufficient numbers of service providers available.

Another aspect of service availability has to do with the rule of law. Supporting US operations is far easier in regions which follow the rule of law. In such societies, fees and requirements are clear and business can flourish. Unfortunately, many of the area of highest military interest suffer most from an absence of the law, resulting in many difficulties establishing and maintaining reliable, secure commercial support.

Geography, infrastructure, and reliable services all serve to make up the equation planners need to consider as they develop support plans for theater operations. While the available commercial options will influence decisions, so will the nature and pace of military operations being supported. Huge, ongoing operations, such as those in CENTCOM today, are far different than a temporary humanitarian operation or non-combatant evacuation operation. The establishment of a Theater Express-type program will have to consider this factor significantly,

as contractors supporting smaller operations might not be as willing to offer large discounts as they would be supporting more concentrated operations.

All of these factors will be used to discuss the applicability of a Theater Express program to any of the geographic commands. Special attention will be paid to AFRICOM, as they are still in the process of establishing business rules for their logistics operations.

Investigative Question 3:

Does Theater Express meet the intent of the CRAF contract, or is expanding it going to weaken the CRAF, and therefore AMC, over the long term?

Evaluating this question requires examining the Theater Express program as it has evolved, and extrapolating that development beyond the existing program. While some program aspects will be universal, some will not, so overall generalizations are difficult to make, but the business environment faced by transportation providers reaches around the world. Therefore, the 3PL literature discussed above will serve as the basis for an analysis of the business case supporting Theater Express, and the CRAF connection the program has mandated.

Additionally, this is a relatively new area for AMC to operate in. Therefore, to properly scope this program, Hammer and Champy's reengineering model is applied to Theater Express. This is done to determine whether Theater Express is a passing fancy or possibly a more permanent part of the operational landscape.

IV. Analysis

Investigative Question 1:

How is the AMD actually carrying out the Theater Express Program? This section will lay out daily and programmatic actions which the AMD has put in place. This encompasses the sub-issues of whether the program has been an unalloyed success, as well as identifying some of the concerns which have developed in the first 3 years of operation.

Summary

Theater Express, as described above, equates to an entire C-130 squadron not being deployed to the CENTCOM AOR, with its aircraft, crews, maintenance, parking, and beddown costs. These are in addition to the per pound saving realized on most tendered air freight movements.

A rough order of magnitude cost estimate for a deployed C-130 squadron is based on UTC data for a 4-ship C-130 lead element, a 4-ship follow on element, and a final 2-ship follow on element. While this is a total of 10 C-130s instead of the 13.3 provided by the Theater Express program, this is a very realistic deployment package and provide a rough order of magnitude accuracy. Total personnel for the squadron adds up to 289, and the squadron would require nearly 140 tons of direct support equipment, such as maintenance stands, generators, and flight equipment. This 140 tons of support equipment does not include base support equipment. A unit of this size would require sizeable support, civil engineering, security, lodging, messing,

and other life support. A very conservative support estimate would be 1 support person to 1 flying squadron person—often bases find their ratios higher than that, but it is an acceptable surmise that the two figures could be at least close. This brings the personnel total up to 578. A housing unit to support 550 personnel, formerly known as a Harvest Eagle set, (Wager, 2002) would be required as well, in addition to deployable fuels equipment for JP-8 (jet fuel), a water source, and a myriad of other requirements. However, for purposes of the Theater Express comparison, an additional unit deployed into the CENTCOM theater would most likely be added to an existing base, so their demands might be partially ameliorated by existing support in theater. Therefore, to consider the personnel cost, 578 people would not be paying taxes on their wages (roughly, \$300 per month across wage grades, total \$173,400); receiving Hostile Fire Pay (\$225 per month, total \$130,050); approximately half the personnel would receive Family Separation Pay (289 @ \$250, total \$72,250); and the 140 tons of cargo would have to be shipped over at a conservative \$3.00 per pound ($\$3.00 \times 140\text{tons} \times 2000\text{lbs} = \$840,000$ one-time cost). (DoD Airlift Rates, 2010) These totals are clearly within the scope of a direct comparison, and total \$375,700 monthly and \$840,000 to both deploy and re-deploy at the end of a 4 month rotation (i.e. $\$840,000 \text{ deploy} + \$840,000 \text{ re-deploy} = 1,680,000$ over 4 months = \$420,000 amortized over the 4 month rotation). Therefore, monthly costs equal $\$375,700 + \$420,000 = \$795,700$ per month.

While this is a significant figure, it does not include any of the costs of flying organic airframes, adding hours and hastening depot level maintenance. These are multi-million dollar decisions which must be made within the context of the greater Air Force. They are very real, but difficult to quantify directly for a Theater Express comparison. Additionally, this figure does not count the costs of infrastructure required to support C-130 operations, such as taxiways and

parking ramps, nor the cost of cargo handling facilities. If these are already built and have sufficient capacity to absorb the additional workload, the marginal cost is negligible; however, if they need to be built from the ground up the cost could be in the hundreds of millions of dollars.

Investigative Question 2:

Based on the answers to the first question, is this program applicable to other theater environments?

Background

The theater cargo movement requirements are far higher for the CENTCOM AOR than they are for any of the other geographic combatant commands: EUCOM (European Command), PACOM (Pacific Command), and AFRICOM (Africa Command). Once active hostilities end, however, it is not certain that this will remain the case. Therefore, a look at all of the theater commands and their propensity to benefit from a Theater Express-type program is appropriate.

EUCOM was responsible for DoD actions in Africa for decades. However, AFRICOM has recently been created to change the focus put on African operations. (AFRICOM, 2010) Although operations in Africa continued uninterrupted during the transition from EUCOM to AFRICOM and nothing on the ground changed significantly, the stand up of a new command marks a good opportunity to explore more in depth the fit a Theater Express program could have in Africa.

EUCOM is a mature theater. Europe is well developed, with many transportation options for planners. Road, rail, and air connections are generally good throughout the theater. Moreover, the rule of law is firmly in place over most of the theater, resulting in many firms offering service between virtually any two points (European Commission, 2001). Additionally, there are large US military organic units in place in Germany which are able to deliver cargo via

air or ground. The result of this infrastructure is that transportation planners in Europe for most scenarios have many cost effective solutions for movement requirements between almost any city pairs.

In this scenario, developing an air cargo tender system such as Theater Express is not a top priority item. Transit times for ground cargo are often comparable with air freight. Since ground transportation is so much cheaper than air cargo, air tenders for cargo are simply not cost effective for most of EUCOM's needs.

PACOM has far fewer options for transportation planners. The vast distances across the Pacific dramatically extend sealift delivery times for surface lift in the PACOM AOR, and there are few areas in which ground transportation is an option. Additionally, PACOM has a constrained organic airlift fleet (primarily two squadrons of C-17s, one at Hickam AFB and one at Elmendorf AFB) and widely distributed operations. Moreover, with CENTCOM hosting the current contingency, there is very little excess common carrier organic capacity to support PACOM requirements.

One advantage PACOM does enjoy, however, is a robust airway structure, with many very large, world-class international airports capable of handling any type of aircraft and playing host to a multitude of professional freight forwarding companies (Runckel and Associates, 2007). There are few locations in the PACOM AOR where US forces could conduct large-scale operations that are not within reach of commercial services. However, this does not account for vast stretches of open ocean, where only Navy operations will take place, nor the many very small islands offering only rudimentary services. While these are certainly there, large scale operations are extremely unlikely at any of them, as they are sparsely populated and widely

distributed. Any operations in these remote locations would have to be supported with organic assets, either sea or air.

These factors combine to create conditions which might encourage PACOM to look at CENTCOM's Theater Express program with the thought of setting up one of their own. They support many operations spread over thousands of miles. (USPACOM Public Affairs, 2009) Some of them are large, but many are small, fitting well into the definition expostulated above for "orphan cargo."

AFRICOM is the geographic command which is charged with responsibility to manage military actions of all types on the continent of Africa. Transportation planners in this AOR have a significant challenge before them. African transportation infrastructure is poorly developed, for both surface and in the airways. There are few connecting roads between AFRICOM locations, few seaports, and few airfields. Moreover, these airfields are widely dispersed and many of them are poorly developed, resulting in a very poor transportation infrastructure for the entire continent (Lima, 2001).

It is difficult to overstate the hurdles faced in moving cargo throughout Africa. The African continent, with only South Africa omitted, as of 1997 had 171,000 kilometers of paved roads (Mutume, 2002). In comparison, the United States alone has 4,209,835 km of paved roads as of 2007 (CIA, 2009), dwarfing the total road mileage found on the much larger African continent. This highlights the compounding issues faced in Africa of the commerce which depends on a road system, such as freight handling, simply cannot develop without the infrastructure to support it. Additionally, Africa is huge, roughly equal in size to the US, Europe, and China combined (Johnston & Brown, 1998). This effectively dilutes the few kilometers of roads existing on the continent to a less than adequate level by almost any measure, and dramatically

limits the AFRICOM planner's options. Combine these limited road links with over 50 countries on the continent, many of whom do not get along, and surface transport becomes very limited, indeed.

Airfields are not well developed, either. Pilotnav.com lists 2141 on the continent, a far cry from the 21,509 they list for the US alone (Pilotnav.com, 2009). However, even this low number is suspect, as, for example, Somalia is listed as having 46 airfields in their database, and most air planners would suggest this number overstates the actual airway capacity of the country. In fact, most of the 46 listed are described with only a latitude and longitude coordinate (or just a name), and no amplifying information. This implies they are not fully developed airports with paved runways or accompanying support activities. In fact, numerous interviews with pilots flying throughout Africa have provided many examples of poor facilities, poor quality fuel, customs personnel demanding bribes at gunpoint—in short, many impediments to the free flow of commerce throughout the AFRICOM AOR.

However, air cargo services do exist on the continent. A quick internet search comes up with several hundred firms offering air freight service between various points within Africa. While all are probably not up to FAA standards for safety, a cargo movement arrangement need not pass as rigorous a safety check as a passenger charter operation. In short, there are firms providing air freight services within the AFRICOM AOR which could conceivably meet some portion of AFRICOM's cargo movement requirements.

In sum, the situation facing the AFRICOM planner consists of: a poor road system, virtually non-existent rail and inland waterway system, and a poor airway system. All of this inadequately spread out over a continent the size of the US, Europe, and China. Emerging requirements, often defined as humanitarian efforts (Kott, 2009), which could at any time flare

up anywhere on the continent. These all combine to suggest that AFRICOM planners might want to consider every option open to them to meet their mission, and this includes a Theater Express program for their AOR..

Investigative Question 3:

Does Theater Express meet the intent of the CRAF contract, or is expanding it going to weaken the CRAF, and therefore AMC, over the long term?

Link to CRAF

From the start, Theater Express was linked to the CRAF program. Although CRAF is a yearly contract, it is generally recognized among the members that it is a long term program, and it does build some of the relationships envisioned by the PBL mandates.

However, the sub-sub-contractors operating most of the Theater Express flights are rarely CRAF members. This certainly is not always true, but by and large they are not US-flag carriers operating in and around the CENTCOM theater. Are they sufficiently linked to the CRAF program so as to not dilute the annual award incentive offered by AMC?

To date, the CRAF members seem to be in general satisfied with the program. While they would all probably want to change aspects of the program, it is unlikely any of them would like to do away with it altogether. There is perhaps an unspoken consensus that this is the direction of the future, and individual companies must be nimble enough to adjust their business models to stay ahead of the competition.

An unintended but probable long term outcome of this program is a push for CRAF cargo carriers to align themselves more closely with freight forwarders. While all of them operate with a number of forwarders, it is conceivable that in the future the CRAF program will adapt to accommodate a forwarding component, and carriers would be awarded business based on their

total contribution to the AMC mission. There is no reason AMC could not incorporate this into the CRAF construct, and over time there will be fewer objections to a policy such as this.

However, at this time there is no need nor expectation that AMC will move in this direction.

PBL

Theater Express incorporates many PBL factors. The Best Value Algorithm's seamless integration of delivery times, by location, city pair, and carrier allows the AMD to easily and quickly monitor contractor performance in the delivery of cargo. Additionally, the reports from the field about damaged cargo, unsafe operations, and any other discrepancies which might happen, can all be (and are) included in the BVA as well. These factors can then be weighted against carrier bids, as the AMD deems appropriate, so that the best value among the bids can be truly determined. For instance, if the lowest bidder on a movement bids 80 cents per pound, but has a terrible track record on timeliness and safety, a carrier with a good track record bidding 95 cents might get the bid for the move. While the apparent cost up front is more, only the second carrier is delivering the promised services, while the first, apparently cheaper, bidder has already demonstrated non-performance. This weighting of factors is built in to the BVA, and so is done automatically for AMD personnel. However, they can override the system recommendations if the situation should warrant. The only requirement is that they document why they overrode the recommendation in the comments section for that entry. This leaves a clearly auditable trail, and prevents even the appearance of any impropriety of the AMD preferring one carrier over another for anything other than performance data.

This method of paying for performance is very much in line with the DoD drive to focus on warfighter requirements—namely, the delivery of cargo in a timely, predictable, and reliable manner. What type or how fast the aircraft flown is not considered, nor is routing. These are

simply peripherals controlled by the carriers in delivery of the final product, and the PBL construct of Theater Express keeps the focus on warfighter requirements.

Long Term Partnering

A major part of the benefits from PBL contracting comes from allowing contractors to focus on mission requirements, rather than metrics to get there. Another part of the benefits derived from this strategy is expected to come from closer integration of supply chain operations between contractors and the military. Where this is too difficult, the contractor has simply been offered most (or all) of the support burden to either manage a program or to get one started and managed until the DoD can take it over organically. (Smith, 2009) (Donovan, 2010)

A relationship of this type can only truly improve the supply chain if both parties buy into the process and act in good faith. Unfortunately, the federal contracting system does not, in general, lend itself well to this type of relationship. Military members are usually directed to hold contractors at arms' length, and grave consequences are preached to those who would get too close. (DAU, 2010) This creates a paradox: even as the DoD is exhorting members in the field to better embrace commercial partners to improve supply chain management, the contracting arm of the DoD remains relatively rigid on contract enforcement. This dichotomy, and the military policy of moving people every 3 years, makes long term relationships very difficult to build with contractors. The experience of the researcher is that companies which expect to be doing business with the military for a long time hire their representatives carefully, and leave them in place to provide that continuity for years and years at a time. The military side usually is unable to reciprocate.

Military decision makers are every bit as guilty as their industrial brethren in wanting to be comfortable with their business decisions. After all, they are managing sometimes billions of

taxpayer dollars and the freedom of much of the world--a wrong decision could be very bad indeed. However, under the mantle of AFSO 21 and others, the Air Force has attempted to modernize programs, think outside the box, and develop new ways of thinking which will harness the industrial power of the nation, which acts as a tremendous multiplier for the military. Theater Express is one of those "out of the box" programs--but is it just business as usual?

Business Process Reengineering—Fundamental Rethinking

Hammer and Champy (Hammer & Champy, 2003) define business process reengineering as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed” (35). In the following pages they break out this definition into four critical components: Fundamental, Radical, Dramatic, and Process. The intent of this section is to review the Theater Express program within Hammer and Champy’s framework and reflect on whether it is truly business process reengineering, or whether its theoretical basis lies more in the incremental improvement approach of AFSO 21 (AFSO 21, 2007).

“**Fundamental**” refers to the very core functions of an enterprise (35). In order to reengineer, Hammer and Champy state that leaders must review the most basic characteristics of operations: why we do the things we do and why do we do them in a particular manner. The underlying assumptions is what leaders are trying to divine, and this can be incredibly difficult to do. However, if those assumptions or rules developed from them turn out to be “obsolete, erroneous, or inappropriate” (35) they need to be swept away in the drive to improve.

Theater Express is in fact a substantial departure from normal Air Force business practices. It was the result of leadership determining first what the enterprise must do, and then searching out new ways to accomplish this mission. Always before, the answer in the Air Force

had been to simply task more C-130 aircraft, and overcome workload issues with more organic capacity. This was simply the most direct course of action open to leadership, the most visible, and the most tested. It was safe territory for decision makers—they were very familiar with the C-130 and its operations, as were their customers, and this increased the desirability of the C-130 option over all others. Theater Express was a step back by leadership, who asked themselves what the core mission of the AMD was—moving cargo and personnel. Starting from this perspective, the most effective and efficient method of increasing air mobility capacity in theater was to capture the commercial ventures which were flying in the area already, with support structures, bases, maintenance, flight crews, and the like already in place, rather than simply tasking in more C-130s. Couple this with the developments mentioned above at the start of the program, especially reduced C-130 availability from wing cracks and expiring mobilization authority for the Reserves, and using tenders to move cargo rapidly became a clear solution to a significant portion of theater cargo airlift. This was in fact a fundamental shift in Air Force air mobility operations.

“**Radical**” refers to throwing away the old business practices and building afresh. This is in direct contrast to the incremental improvement model espoused by AFSO 21. “Radical redesign means disregarding all existing structures and procedures and inventing completely new ways of accomplishing work” (36). While Theater Express was arguably a Fundamental transition into a new way of moving cargo, it was not a Radical shift. The command and control structures of the AMD were incrementally modified to accommodate this new business practice, rather than being completely re-thought and functionally aligned along processes. Additionally, the aerial port and other support functions underlying the program were not radically changed.

For the most part, they were able to incorporate this new program as part of existing business practices and rules, with minor alterations.

“**Dramatic**” in this context refers to the type of gains expected by reengineering. They should be dramatic, not marginal. Indeed, in the text, Hammer and Champy talk about “quantum leaps in performance,” and dismiss theoretical 10% improvements as not a worthy goal for reengineering (36). This section breaks down firms requiring reengineering into three categories: those in crisis, who must reengineer to survive; those who see a crisis looming; and those who are at the top of their game and reengineer to further solidify their lead on competitors.

This puts the air mobility enterprise into an interesting light. At the time of the Theater Express development, the system was not yet in crisis. Capacity within the airlift system was sufficient to meet demand. There were enough organic aircraft on hand for airlift planners to task against cargo and personnel requirements, although the scheduling process was becoming strained by the demands being place upon it. Therefore, according to Hammer and Champy’s definition, the air mobility enterprise was not a firm in crisis.

On the other hand, there were several drivers pushing the enterprise towards a crisis situation. As discussed above, C-130 availability was projected to drop, due to wing crack issues and the mobilization authority for the Air Reserve Component (ARC) forces expiring. This removed all the C-130s with wing problems from the mix, both active and ARC, and removed most of the ARC C-130s from the deployment pipeline. The significance of this latter statement cannot be overstated, as the ARC makes up approximately 65% of the C-130 fleet, dramatically increasing demands on the smaller active duty forces (C-130). At the same time, the Chief of Staff of the Air Force was pushing airlift forces to fly even more cargo than ever, to help remove

convoys from the dangerous roads of a very active combat zone in Iraq (House, 2). Combined, these factors left the CDDOC and AMD facing a mounting air cargo demand with a shrinking fleet. It is a fair assessment that Hammer and Champy would have categorized the air mobility enterprise at that time as a company who saw storm clouds looming on the horizon.

The third category, firms at the top of their game who “see reengineering as an opportunity to further their lead over their competitors,” is simply not applicable to the air mobility enterprise in CENTCOM. Resources are always constrained, both as a fiscal responsibility to the US taxpayers and to minimize the forward footprint of deployed forces (AFDD 2-4, p. 2). While the enterprise was continually effective and remarkably resilient, it is difficult to categorize it as attempting to raise the competitive bar (Hammer and Champy, 37).

Considering the categorization of air mobility within the reengineering framework, it is fair to suggest that the leadership was seeking order of magnitude improvement in the cargo movement system as they introduced the Theater Express program. Incremental changes had been attempted over the years, and while they had often borne some improvements, they had not proved either lasting or sufficient to carry air cargo transport in the theater to the next level. Moreover, the fleet adjustments which had been the AMD’s chief tool for several years was no longer an option, so leadership was forced to reach out to a new constituency and break some new ground for the Air Force.

“Processes” is the fourth key word called out by Hammer and Champy (38). They state that this is the most difficult area for management to grasp, as reaching out to embrace a process view requires leadership to reach well beyond the task structure they are generally familiar with and which has worked for them in the past. Hammer and Champy define a process as “a

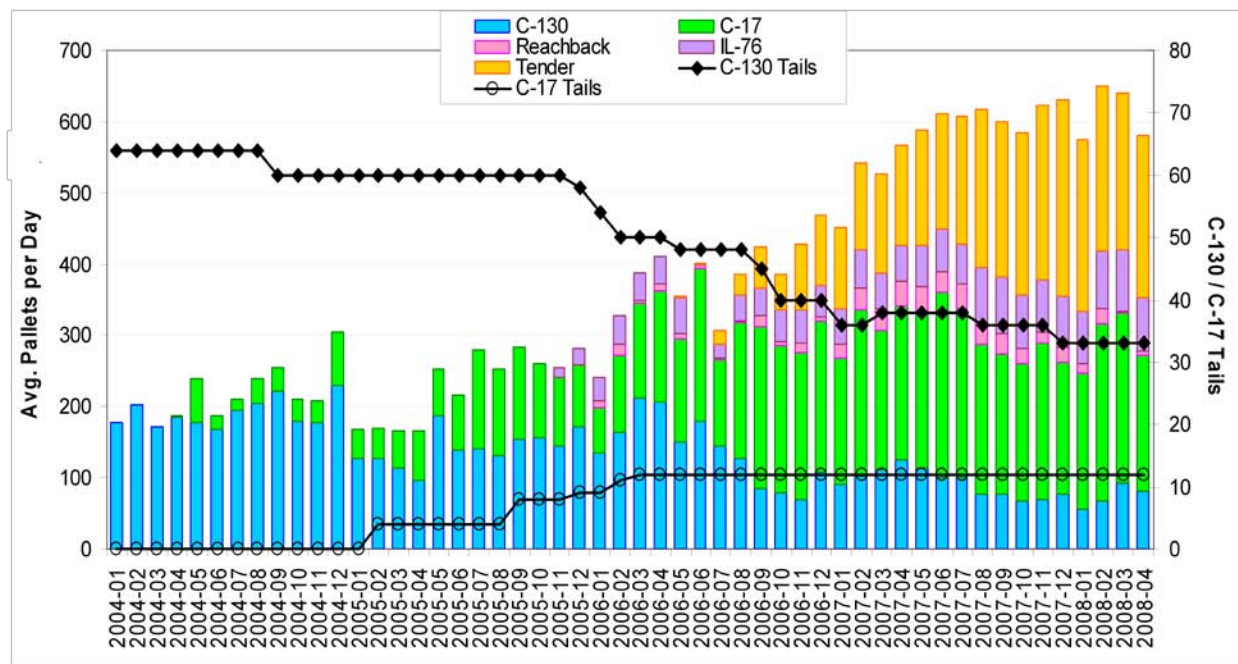
collection of activities that takes one or more kinds of input and creates an output that is of value to the customer.” (38)

In creating the Theater Express program, leadership pushed back the perspective of the air mobility enterprise. Usually in the Air Force, flying aircraft is defined as the mission, even for mobility assets. This is in contrast to what the customer values, which is the movement of cargo and passengers in a timely and reliable manner. Leadership was able to bridge this gap, and embrace alternate sources for the movement of cargo outside of normal US Air Force lanes—namely, using third party air cargo contractors for less than aircraft loads on a tender (i.e. non-contractual) basis.

It is difficult to overstate the effort which was required for this. It took a looming crisis to push leadership to adjust their perspective. The task-orientation of the military is both legendary and deserved. It was extremely sensitive for leadership in the flying community to allow some portion of “their work” to be carried by commercial aircraft, and even more so for that practice to become institutionalized. However, over the past several years, the program has become more accepted as an integral part of theater airlift.

All of these considerations are part of the framework developed by Hammer and Champy to decide if an effort is truly reengineering, or whether it is simply a incremental improvement with either small or transient improvements. While it is difficult to suggest that the Theater Express program was Radical change, with the command and control structure for airlift left in place in the AMD, it was clearly Fundamental and Process oriented. The graph below depicts the growth of theater air cargo against the number of US Air Force mobility aircraft in theater. There is simply no doubt that the growth of Theater Express has delivered results anything shy of Dramatic, covering almost all of the growth in air cargo demand since its inception in July 2006.

Because they are beyond the scope of this study, passenger demands are not captured on this workload data, but they have been a huge factor in theater workload as well.



Source: AMC/A9 Briefing, Hurlburt AFB, FL, 17 Sep 2009

Conclusion

Theater Express is an example of the DoD breaking some paradigms and focusing directly on warfighter support. The metrics underlying that support are not what Theater Express measures, but rather the delivery of required cargo in a reliable, timely manner. While it has been constructed to fit into the tried and true contracting structure, this program is a harbinger of business relationships to come. It is very commercial in its approach, much more so than most Air Force programs. It is a good example of the type of contracting the DoD is looking for when they ask for Performance Based Logistics.

V. Conclusions and Recommendations

The overall research question analyzed for this study was “What is the right mix of joint tactical air assets to conduct operations along the LTM?” This led to a secondary question dealing with TS/MC requirements and assumptions. At the end of the day, the Soldier, Airman, Marine or Sailor at the very end of the supply chain does not care how he or she receives the things needed, as long as they are received on time. The DOD and the Air Force have a responsibility though, to ensure that options are carefully weighed to ensure operations along the LTM are conducted in a manner that guarantees those forces in the field do not wait long and can have their needs readily met. That responsibility led to Investigative Questions 1 and 2.

Investigative Question 1:

How is the AMD actually carrying out the Theater Express Program? This section will lay out daily and programmatic actions which the AMD has put in place. This encompasses the sub-issues of whether the program has been an unalloyed success, as well as identifying some of the concerns which have developed in the first 3 years of operation.

Summary

Theater Express got off to a deliberate start, with a test phase in July 2006 in which 598 pallets were tendered to the program participants at an average cost of \$1.56 per pound (CDDOC, 2007). The following month saw a large increase to 931 pallets and an average cost of \$1.46 per pound. By April of 2007, the program was moving over 4,000 pallets per month at an average cost of \$0.87. From there, it has continued to grow significantly, as depicted above in Figure 1, and now accounts for approximately 40% of all intra-theater cargo. Movements

average over 6,000 pallets per month, and costs per pound are an average of \$1.19. (AMC, RAND, 2008) While this average cost has increased, the 2008 data making up the bulk of the data reflect a doubling of fuel prices worldwide. (Air Transport Association, 2009)

In the beginning of the program, the CDDOC measured “C-130 Sorties Avoided.” As the program matured, this measurement was dropped, for various reasons. However, it is a simple calculation to roughly quantify. A C-130 is considered full if it has 5 pallets (the ramp is so restrictive as to not be generally usable for other than baggage). In a given day, an average C-130 can fly 4 sorties. Assuming a 75% load factor (which is generous; the actual number is only trackable with information from classified systems), a C-130 can therefore move roughly 15 pallets per day. 6,000 pallets per month is a daily average of 200 pallets, and 200 divided by 15 equals 13.3 C-130-equivalents provided by the Theater Express program on a daily basis.

This equates to an entire C-130 squadron not being deployed to the CENTCOM AOR, with its aircraft, crews, maintenance, parking, and beddown costs. These are in addition to the per pound saving realized on most tendered air freight movements.

The safety concerns first noted in the program have been, by and large, mitigated, although some concerns remain. Due to the nature of the industry in the region, it is doubtful whether FAA-type safety standards can ever be imposed on carriers operating in the CENTCOM AOR. However, safety issues to date have not grossly endangered personnel, and while some have been significant (the collapse of landing gear by a carrier on the ramp at Kuwait International, for instance) they have mostly been minor. Moreover, the frequency of incidents has been improving over time with focus from the AMD.

In short, the mechanics of the program seem to be sound and have developed strong industry relationships over the past several years. In addition, this program has saved the US

taxpayers millions of dollars in direct costs per pound for moving air cargo, as well as the costs of an additional deployed C-130 squadron and its associated beddown and support. The CDDOC and AMD have put together a very strong program to augment airlift capability in theater.

Investigative Question 2:

Based on the answers to the first question, is this program applicable to other theater environments?

Absolutely. This program could work in any theater, even a global AOR such as that monitored by TACC. However, as discussed, the theaters would derive various levels of benefit from a Theater Express program of their own.

EUCOM would probably derive little benefit from an air cargo tender program. With the robust ground infrastructure and relatively short distances in EUCOM, it is difficult to envision an air freight tender program dramatically cutting delivery times for mission critical cargo throughout the AOR.

PACOM and AFRICOM, on the other hand, could benefit greatly from a Theater Express program which encompassed their theaters. With their vast distances and widely dispersed operations, both of these theaters could enhance their cargo delivery effectiveness by harnessing the commercial cargo network which is operating in their AORs. PACOM, with its more robust airway infrastructure has more options available to it than AFRICOM, but AFRICOM, even with the challenges faced within their AOR, could still build their operational reach to encompass all areas of their theater served by commercial operators. Especially in the current operating circumstances, with US military attention fixed on the contingency operations in the CENTCOM

AOR, these other theaters could open up their transportation options significantly by expanding beyond the constraint of whole aircraft charters.

TACC itself could benefit from the Theater Express program. There is no inherent tie for the program to the theater level; TACC could run it from Scott AFB in Illinois for any location in the world. There is no reason TACC could not make Theater Express part of their standard reachback capabilities for use in supporting other combatant commanders. This is especially true for “orphan cargo,” as described above, when TACC, under their current operating structure, is forced to put whole aircraft against less than full plane loads. Additionally, if TACC were to assume the mantle for this program, it would be instantly operational for any area in which a contingency might develop, from a humanitarian crisis to all-out war.

Investigative Question 3:

Does Theater Express meet the intent of the CRAF contract, or is expanding it going to weaken the CRAF, and therefore AMC, over the long term?

The analysis of CRAF relationships, business models, and paradigm shifts taking place throughout the DoD contracting structure all indicate that the CRAF will not be undermined by the Theater Express program, or programs like it developed in other geographic theaters. The link to CRAF carriers, who actually pledge airlift assets against AMC missions requirements, seems to be sufficient to maintain carrier interest in the program.

There are other dynamics at work keeping the CRAF program healthy, of course, most of them well beyond the scope of this study, but a reasonable analysis of the program and its potential do not indicate it will negatively impact this critical strategic program. While some individual members might have to adjust their business practices to remain competitive, this has

always been the case in the airline world, and CRAF carriers have always been exceedingly competitive.

Overall Conclusions and Areas for Future Research

Theater Express has proven itself to be a sound program for the military and the taxpayer. It has enhanced theater cargo delivery at low cost and high effectiveness. Additionally, the constraints put in place to include CRAF carriers in the program has shown itself to be a good structure, rewarding carriers who pledge their assets to the support of the nation in the strategic CRAF program.

Future research should consider the results of any audits which might take place on this program, to ensure costs are being correctly captured. Another topic worthy of consideration is advancing the program along with the projected growth in international air freight. It is conceptually possible to see a day when the aerial port function, with the exception of active combat offload sites, is supported by commercial industry, and contractors on a military base ramp will load either organic aircraft or commercial tails as requirements dictate. While this is a radical proposal, it is not inconceivable as a long term Air force end state.

An additional future research topic might center around the better integration of military and civilian cargo moving capabilities through the adoption by the military of commercial pallet and net standards and equipment. This could have the effect of broadening the pool of carriers able to haul military cargo, as well as having secondary effects within the military airlift community.

The Theater Express program just scratches the surface of what is possible in the transportation industry with the cooperation of 3PL companies. They have been growing quickly for many years, and offer packages of service industry has welcomed. It is possible that the US

military could find more ways to integrate this type of service provider into worldwide operations, and future study could examine the roles 3PL providers could play on the military's behalf.

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14. ABSTRACT <p>Air Mobility Command (AMC) has historically focused on the movement of air cargo via whole aircraft loads. The process for moving these loads has been roughly similar for either organic (military or gray tail) aircraft or commercial augmentation. Cargo is aggregated at the aerial ports and consolidated onto aircraft as required. However, this has occasionally created "orphan cargo," the single pallet destined for a location not serviced often by AMC.</p> <p>The third party logistics business model has gained tremendous ground in the past several years. Companies all over the world have taken advantage of outsourced shipping, packing, door-to-door services, and the like, creating a multi-billion dollar freight forwarding/cargo handling industry which very often deals in less than full aircraft movements.</p> <p>The assimilation of these two trends is the focus of this research. How to best leverage the strengths of the transportation industry to better serve our warfighters on the ground, within the fiscal constraints of the modern Air Force. This research looks in depth at the processes used currently in the South West Asia theater, and then briefly explores their applicability to the rest of the world.</p>					
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